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First record of the vulnerable social parasite ant *Plagiolepis grassei* in Italy (Hymenoptera: Formicidae)

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Abstract
The first Italian records of the rare parasitic ant species *Plagiolepis grassei* Le Masne, 1956 are here reported. This species is considered as "Vulnerable" by the IUCN's Red List, and was previously recorded from France and Spain only.

Key words: geographic distribution, conservation, rarity, IUCN Red List, myrmecology, Sicily.

Introduction

Plagiolepis Mayr is a genus of minute formicine ants widespread across temperate and tropical regions of the Old World (Robertson 2000), consisting of 61 valid species and 19 valid subspecies (Bolton 2016). Unfortunately, no modern taxonomic revision of the genus exists. *Plagiolepis grassei* Le Masne belongs to a group of social parasites permanently living (i.e. "inquiline", sensu Wilson 1971) in colonies of other *Plagiolepis* species, and its host is *P. pygmaea* (Latreille, 1798).

Social parasitism is a widespread biological adaptation among ants, shared by phylogenetically distant and mostly holarctic taxa. At least further eight parasite *Plagiolepis* species are known so far (Buschinger 2009).

Le Masne (1956) described *P. grassei* and compared it to the workerless inquiline *P. xene* Stärcke, 1936, and to their host *P. pygmaea*. Le Masne (l.c.) considered those species as morphologically closely related, and thought they were clearly distinct from any other Mediterranean *Plagiolepis*. Moreover, by observing the differences in queens and workers size, and the presence/abundance of workers as well, Le Masne (l.c.) hypothesized each of the three species as a possible evolutionary step. These steps are represented by a free-living species (*P. pygmaea*), from which the other two originated: an intermediate parasite species (*P. grassei*), with smaller queen and a limited number of workers, and a highly specialized workerless parasite with tiny queens (*P. xene*). Contributions to the knowledge of the biology of *P. grassei* came from Passera (1967, 1969, 1970, 1977), while a genetic investigation by Trontti et al. (2006b) shows *P. grassei* fits the so-called (although sometimes questionable) "Emery's rule" (see Emery, 1909), about the origin of parasitic ants from their close relatives serving as host.

P. grassei was firstly collected in France, in the Eastern Pyrenees (Le Masne 1956) (from where it was also reported by Trontti et al. (2006a) near Cerbère), and was later found at Pontevedra, Galicia, Spain (Espadaler 1979). In May 2016, it was also found at two additional French sites, namely La Javie (N44°12'43", E6°17'1") and Pompignan (N43°53'6", E3°50'1") (R. Blatrix, pers. comm.). In 1996 the species was listed as VU (vulnerable) in the IUCN red list by the Social Insects Specialist Group (together with two other social parasitic European *Plagiolepis*: *P. ampeloni* (Faber, 1969) and *P. regis* Karavaiev, 1931). Considerations about genetic vulnerability and conservation of *P. grassei* were expressed by Trontti et al. (2006a) in relation to its weak dispersal capabilities and estimated small population.

Materials and methods

Italy: Sicily, Palermo, Gole del Drago, N37°51'56" E13° 18'2", 450 m, 1 May 2016, E. Schifani legit, 4 ♀♀ (E. Schifani personal collection); Sicily, Palermo, Monte Pellegrino, N38°10'22", E13°21'5", 400 m, 31 May 2016, E. Schifani legit, 2 ♀♀ (E. Schifani personal collection).

All of the specimens are preserved in 95% ethanol. All the queens were collected under stones, from two nests (one at each collecting site) of *Plagiolepis pygmaea*, in areas where the latter is very abundant. Few queens of *P. xene* were also found in both nests, but no workers of *P. grassei* could be detected (even though no careful search was carried out in order to find them). The first site was characterized by an open landscape with low Mediterranean maquis, in some parts degrading towards garrigue, while the second consisted of an artificial *Pinus* and *Eucalyptus* reforestation. At both sites carbonatic rocks were

Fig. 1 – Two *Plagiolepis grassei* queens (1) and two *P. xene* queens (2) among workers of *P. pygmaea* (3) photographed under a stone. Gole del Drago, Palermo, Italy. Photo by Enrico Schifani.

very abundant. The specimens were identified by means of a stereomicroscope, according to the diagnostic features pointed out by Le Masne (1956) and Bernard (1967).

Discussion

The present discovery greatly extends the known distribution range of this rarely collected species. *Plagiolepis grassei* occurs in low numbers inside nests of *P. pygmaea* and can be easily overlooked. Consequently, it probably occurs elsewhere, and its "rarity" is partially influenced by the difficulty to detect it in the field (an issue also raised by Espadaler X. & López-Soria 1991, regarding parasite ants in Spain). Even the present day evaluation of its conservation status may be considered as provisional (as well as for *P. regis* and *P. ampeloni*). Nonetheless, general caution and concern appear to be justified also for the reasons expressed by Trontti et al. (2006a) regarding genetic vulnerability of the parasitic ants of the genus *Plagiolepis*.

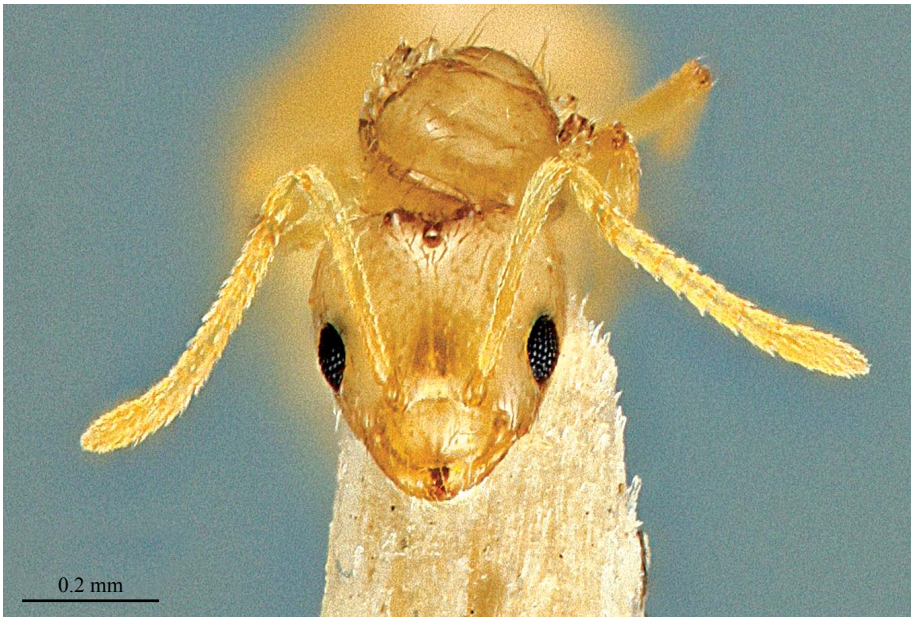

Fig. 2 – *Plagiolepis grassei* queen in full-face view. Specimen collected in Monte Pellegrino, Palermo, Italy. Photo by Marcello Romano.

Fig. 3-4 – *Plagiolepis grassei* queen in dorsal and body profile view. Specimen collected in Gole del Drago, Palermo, Italy. Photo by Marcello Romano.

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